REMARKS

Claims 1-20 are presently pending. Careful reconsideration in view of the following remarks is most respectfully requested.

Rejections Under 35 U.S.C. 103(a):

In paragraph 3, claims 1-20 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over WO 99/36214 (WO'214) in view of Aslund et al. These rejections are most respectfully traversed, as follows. In the following discussions, various remarks provided are not intended to limit the claims in any way, but to serve as a basis of general explanation to help the Patent Office appreciate the technology and background. In the interpretation of the claims, provision should be solely made to the claim language and the specification.

First, it is most respectfully submitted that the present claims recite combinations of features that are not taught or suggested by the cited references, whether taken alone or in combination.

For example, **claim 1** recites, for reference a novel and unobvious combination of features including "[a] method for preparing a sintered structural steel part **with a carbon content of about from 0.1% up to 2% by weight**, comprising: pressing an agglomerated spherical soft iron-based powder containing about from 0.5% to 2% by weight of a thermo-reversible hydrocolloid as a binder to a green body of high density, heating the green body to a temperature of about 450-650°C under a controlled atmosphere to remove the non-carbon content of the binder, and then

sintering the green body at a temperature of about 1100-1400°C **to allow the remaining carbon to diffuse homogeneously into the sintered body, giving structural parts of high density and having high strength properties**." Emphasis added to facilitate reference.

In addition, **claim 13** recites, for reference a novel and unobvious combination of features including: "[a] method for making **a high strength steel part** from a soft iron-based powder, comprising: mixing a soft iron-based powder with a thermo-reversible hydrocolloid binder into an agglomerated powder, **said hydrocolloid binder acting as a means to add carbon to the powder**, pressing said agglomerated powder to a green body, heating the green body to a temperature of about 450-650°C under a protective atmosphere that prevents oxidation to remove the non-carbon content of the binder substantially, and sintering the green body at a temperature of about 1100-1400°C **to create a structural part of high strength**." Emphasis added to facilitate reference.

In addition, **claim 19** recites, for reference a novel and unobvious combination of features including: "[a] method for making **a high strength steel part by simple pressing and sintering of metal powder**, comprising: mixing an agglomerated powder having a soft iron-based powder and a **binder that acts as a means to add carbon to the powder**, pressing said agglomerated powder to a green body, heating the green body under a protective atmosphere that prevents oxidation to remove the non-carbon content of the binder substantially without removal of carbon content, and sintering the green body to create a structural part of high strength." Emphasis added to facilitate reference.

Second, it is respectfully submitted that the cited references have a number of deficiencies that were overlooked by the Patent Office. Among other things, it is respectfully submitted that the WO '214 reference has substantial deficiencies and that the Aslund et al. reference does not fulfil those deficiencies.

With respect to art such as, e.g., in WO '214, it is respectfully noted that when high density sintered parts were to be produced from spherical metal powders of stainless steel materials, it was of significant importance to keep the content of carbon **as low as possible** in the final product after agglomeration and sintering. With that in mind, techniques were developed to **reduce the content of carbon** in the sintered parts of stainless steels and other high qualitative steels. When the agglomerated metal powders, which were agglomerated with a hydrocolloid binder, were heated in air at temperatures about 500°C, said hydrocolloid, having about 50% of carbon, was decomposed and the resulting gases, as well as the carbon, burnt out. **This meant that the content of carbon in the steel could be kept at the lowest possible level.**

On the other hand, the achievements of the preferred embodiments of the present invention are not taught or suggested by the cited references. When experimenting with an inert atmosphere, for instance hydrogen or argon, during the heating of the agglomerated powder before the sintering, the present inventor discovered that all or substantially all components of the binder disappeared except the carbon. This result was not foreseeable by those in the art. As the binder may be very evenly distributed on each powder particle and the carbon may be very reactive when the binder is decomposed under protective atmosphere, the carbon can, e.g., immediately diffuse into the alloy, which can in turn bring about a very homogeneous

distribution of the carbon. It should be emphasized that the quality of the final product may depend on the distribution of the carbon, which may be especially true for carbon steels, tool steels, high speed steels and nickel base alloys.

In addition, the preferred embodiments of the present invention can be used to, e.g., produce high carbon steel products with, e.g., high strength properties from a low carbon steel powder by sintering. On the other hand, in the cited application, the hydrocolloid binder is only used as binder to make the powder particles stick together. Then, it is completely removed by heating at a temperature of 300 to 500°C, resulting in a very dense sintered body. Meanwhile, according to the preferred embodiments of the present invention, part of the binder, or, e.g., part of the carbon content of the binder, diffuses into the alloy **producing a high carbon steel product.**

The specification of WO '214 mentions on page 4, last paragraph, that the spherical powder to be sintered can be "a powder of a carbon steel or stainless steel, or any other high melting alloy based upon nickel, iron or cobalt" and that said alloys also can contain smaller amounts of a number of other elements, for instance carbon. If spherical particles of a carbon steel are to be used in the cited process, said particles have to undergo soft annealing, which is a costly process, before being agglomerated, in order to produce a high quality product. To add carbon in the form of fine grain graphite to a metal powder before sintering is a well known technique used for the addition of carbon to steel. This will, however, **result in a less homogeneous product.**

Nothing in the specification of the cited reference teaches or suggests in any way that the hydrocolloid binder could be used as an alloying element. Nor do the examples

in the cited application describe a process wherein part of the colloid binder is used for increasing the carbon content of the sintered alloy.

In the preferred embodiments, a problem to be solved by the present invention was to produce structural steel products of **high strength properties** from a metal powder of less strength properties by sintering. On the other hand, previously such steel products were mainly produced by forging, casting or hot isostatic pressing followed by machining.

It is, thus, most respectfully submitted that the cited references neither teach or suggest the present invention as claimed. Withdrawal of these rejections is most respectfully requested.

Concluding Remarks:

In view of the above amendments and remarks, early reconsideration and allowance are respectfully requested. In the event that any fees are due in connection with this filing, please charge our Deposit Account No. 02-2135.

RESPECTFULLY SUBMITTED,					
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